

Use of CytoSorb in Streptococcus pneumoniae Sepsis

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This case study reports on a 69-year-old patient (pre-existing medical history: lung carcinoma with upper and lower right lobe resection one year before), admitted to hospital via emergency transport with fever, respiratory insufficiency, hemodynamic instability as well as signs of sepsis.

Case presentation

- Direct transfer to intensive care unit with non-invasive ventilation
- Intubated and ventilated due to respiratory exhaustion (PaO₂/FiO₂ ratio of 150)
- High-dose antibiotic therapy with piperacillin/tazobactam and clarithromycin
- The CT showed infiltrates in the right upper lobe and the diagnosis of pneumonia was made
- Subsequently multiple bronchoscopies with detection of Streptococcus pneumoniae (mucoid form)
- Development of severe hemodynamic instability with the need for very high doses of catecholamines (norepinephrine 9.6 mg/h, terlipressin 0.16 mg/h) and maximum volume therapy 1 l/h (15 liters/20 hours)
- The patient had to be resuscitated (1 reanimation cycle) as a result of slight repositioning maneuvers, his circulation could be restored with an infusion of adrenaline however he remained hemodynamically unstable
- Highly elevated inflammatory parameters (CRP 406 mg/l, leukocytes 18 E⁹/l, PCT 160 ng/ml) as well as severe impairment in renal function (creatinine 4.3 mg/dl, GFR 14 ml/min/m²)
- Due to renal failure, metabolic acidosis (pH 7.07, lactate 8 mmol/l) and hemodynamic instability with further increasing norepinephrine doses the decision was made to start renal replacement therapy together with CytoSorb

Treatment

- Three treatments with CytoSorb for a total treatment period of 50 hours (6 hours, 20 hours, 24 hours)
- CytoSorb was used in conjunction with CRRT (Multifiltrate, Fresenius Medical Care) performed in CVHD mode
- Blood flow rate: 100-150 ml/min
- Anticoagulation: heparin
- CytoSorb adsorber position: pre-hemofilter

Measurements

- Demand for catecholamines
- Inflammatory parameters (CRP, PCT, leukocytes)
- Metabolic variables (lactate, pH)
- Renal function

Results

- Hemodynamic stabilization with a significant reduction in catecholamine doses - norepinephrine halved within the first 24 hours and could be consistently reduced in the further course
- Clear reduction in inflammatory parameters (PCT halved from day to day, with 78 ng/ml already after the first 24 hours, CRP from 400 mg/l to 275 mg/l, leukocytes from 18 E9/l to 13 E9/l and later to 10 E9/l)
- Lactate (from 5 to 2 mmol/l) and pH (from 7.0 to 7.3) improved significantly throughout the course of the treatments and normalized
- Improvement in renal function
- Clear improvement in oxygenation index to over 200

Patient Follow-Up

- In the further course the patient had to be tracheotomized, however he was awake, oriented and able to mobilize
- Patient is still planned for right lobectomy due to suspicion of a persisting infective focus

CONCLUSIONS

- Rapid hemodynamic stabilization resulting in a reversal of the shock state with otherwise exhausted therapy
- The rapid initiation of treatment in ICU with the combination of appropriate antibiotics, CytoSorb and CVVHD enabled an effective stabilization of the patient's clinical situation
- The installation of the Cytosorb absorber into the CVVHD circuit was simple and safe